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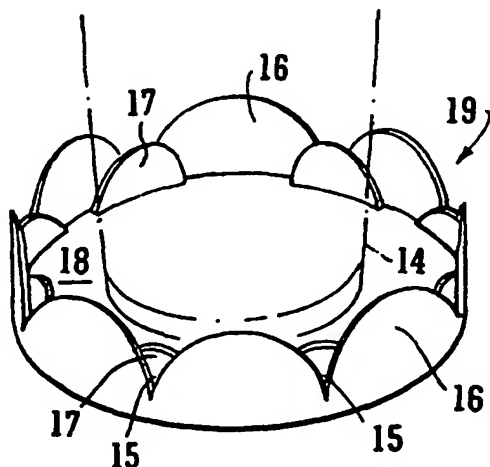
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(54) Title: SLUG AND SNAIL DETERRENT DEVICE



(57) Abstract: A barrier defining a plant enclosure, a plant container, or a tray for such a container has an upstanding wall or rim having a first series of consecutive undulations (16), rather like petals, providing or provided along its top edge and a second series of undulations (17) disposed at a narrow spacing inwardly or outwardly of the first series. There are various options for provision of the second series of undulations, e.g. provided along the top of a divergent flange, or providing a second rim in a tray. Means providing the first and/or second undulations may be separable from the barrier, container or tray and the first and second undulations are preferably staggered relative to each other. Slugs or snails tend to follow the undulating top edges instead of entering the plant enclosure.

WO 01/54485 A1

WO 01/54485

PCT/GB01/00319

- 1 -

SLUG AND SNAIL DETERRENT DEVICE

This invention concerns means to deter snails and slugs from reaching vulnerable plants.

An object of the invention is to provide an effective slug/snail deterrent which eliminates the need for slug pellets or other chemical pesticides, which is safe for children and other animals, which eliminates the need for any personal contact with slugs/snails (dead or alive), and which is substantially maintenance free.

This invention is applicable to a barrier for providing at least part of an enclosure for plants, to a plant container, such as a plant pot or larger tub or planter or even a hanging basket, or to a tray or any similar shallow basal support or underlay for holding at least one plant container, such as a plant pot or tub as mentioned above, or just a sack or bag of growing medium.

According to one aspect of the invention the barrier, plant container, or tray (or the like) should comprise an upstanding wall or rim having a first series of consecutive undulations provided along its top edge and means providing a second series

WO 01/54485

PCT/GB01/00319

- 2 -

of top edge undulations disposed at a narrow spacing from the first series. In this respect, the first series of undulations may comprise a plurality of convex contours, rather like a series of petals. Notches defined between adjacent convex contours will allow for drainage.

The upper region of each petal may be bent outwards, e.g., in a curving manner, and may extend to a pointed tip.

Slugs and snails have been observed to have a tendency to travel along a top edge, and where this is gently curving or sloping they will often tend to follow the curvature or slope, rather than go over the top. The second series of undulating formations are provided outside or inside the first to reinforce the effect of deterring slugs and snails from entering the plant enclosure or plant container. The second series of undulations may be staggered relative to the first series.

According to a second aspect of the invention, the barrier, plant container, or tray (or the like) should have a downwardly directed lip, preferably of a depth of at least 4cm, in addition to having an upstanding wall or rim provided with a series of consecutive undulations as its top edge.

Preferably the barrier, plant container or tray should also have a flange disposed inwardly of the lip so as to create a

WO 01/54485

PCT/GB01/00319

- 3 -

downwardly open channel at least 4cm in width. Both the downturned lip and its extent, and the channel behind it, tend to confuse slugs and snails as to their direction of travel and hinder them from reaching the plant enclosure or getting into the container or tray.

The feature of the downturned lip and optional, but desirable, inner flange is present in addition to undulating top edge means provided on a wall or rim of a barrier, plant container or tray, to maximise the overall deterrent effect.

The invention will be described further, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a front view sketch of a simple embodiment of a barrier in accordance with the invention;

Figure 2 is a cross-section along line II-II in Fig. 1;

Figure 3 is a similar cross-section of another embodiment of a barrier in accordance with the invention;

Figure 4 is an enlarged scale sketch showing separable pairs of undulating formations being mounted onto a plain barrier;

Figure 5 is a perspective view of a first embodiment of a tray

WO 01/54485

PCT/GB01/00319

- 4 -

for holding a plant pot in accordance with the present invention; Figure 6 is a diagrammatic cross-section showing a variant of the upstanding convex contour shown in any of Figures 1 to 5 or 8 to 14;

Figure 7 is a diagrammatic partial front view showing another variant of the upstanding convex contour shown in any of Figures 1 to 5 or 8 to 14;

Figure 8 is an end and partial perspective view of a third embodiment of a barrier to which the present invention is applied;

Figure 9 is a similar view of a fourth embodiment of such a barrier;

Figure 10 to 13 are similar views of four further embodiments of barriers in accordance with the invention;

Figure 14 is a perspective view sketch of a second embodiment of a tray for a plant pot to which the invention is applied; and

Figures 15 and 16 are enlarged scale sketches showing two types of spout means which may be provided in variants of any of the embodiments of Figs. 1-5 and 8-14.

WO 01/54485

PCT/GB01/00319

- 5 -

Figure 1 shows a simple upright barrier (10), suitably of plastics material, which has an undulating contour (11) along its top edge. A second array of undulations (13) are provided at a short spacing from the top edge contour (11) by virtue of a thin flange of material extending at an angle of about 5°-10° from the plane of the barrier (10). Thus in cross-section the top portion of the barrier (10) is forked, as shown in Figure 2. The second array of undulations (13) are offset relative to the first, as shown.

The lower portion of the barrier (10) is formed into a series of points (21) so that it can be readily inserted into the earth. In this respect, the barrier (10) is of a suitable height to be used to form an enclosure, or part of an enclosure, for plants by having its lower margin inserted into the earth. The illustrated version of the barrier is planar, but it could be corrugated, the corrugations suitably running vertically.

Exactly the same principle of an undulating top edge and second adjacent array of undulations can be applied to the rim of a plant pot or other plant container, or a tray or underlay therefor. Such devices could also be corrugated.

In other embodiments the second array may be formed or affixed in some other way, for example from a projecting ledge on the

WO 01/54485

PCT/GB01/00319

- 6 -

barrier, wall or rim.

The undulations serve to confuse some slugs/snails as to their direction of travel so that they tend to follow the curves of the top edge instead of entering the container, tray or enclosure to attack the plants growing there, and then eventually descend and leave to the outside.

In the case of a barrier the lower portion thereof may also be forked or of inverted V shape, as shown in Figure 3, to reduce the chance of slugs burrowing below the barrier to reach delicate plants.

Figure 4 shows how individual pairs (23) of undulating formations, one slightly offset and projecting behind the other may be fixed in a row to the top of an existing barrier (25), such as that around a vegetable plot or raised bed. It will be noted that the formation which lies behind is of a somewhat different shape, being smaller and having flat, upright side edges. Resilient channel means (33) are provided to fit over and grip onto the top of the existing barrier. In other embodiments other means of attachment may be provided.

Figure 5 shows the same general principle applied to a tray (19) for a plant pot, the position of which is indicated at (14). In this case the upstanding rim of the tray (19) is formed of a

WO 01/54485

PCT/GB01/00319

- 7 -

series of adjacent convex contours (16), in the manner of petals, around the periphery of a circular base (18). Between adjacent petal contours (16) there are a corresponding series of notches (15) which allow for drainage from the tray (19). An additional series of convex, upstanding, generally hemispherical projections (17) are provided at a small spacing, e.g. approximately 1cm, inwards of the peripheral petals (16). The base of these inner projections (17) may or may not meet the rim contours (16) of the tray (19) depending on the manufacturing technique adopted.

These inner projections (17) may be smaller than the peripheral petals (16), as shown, and therefore not abutting each other (i.e. spaced apart). Also, as shown, they are preferably arranged so that their highest central regions coincide with the notches (15) between the outer petals (16). The outer edges of the inner projections (17) may also be bent or curved towards the outer petals (16).

The projections (17) enhance the deterrent effect of the first set of petals (16).

In other embodiments similar to those shown in Figures 1 to 5 (or later embodiments described hereinafter) any of the undulations (11, 13) or convex contours or petals (16) and/or (17) may have their upper portions curving outwardly of the tray (19), as shown in Figure 6.

WO 01/54485

PCT/GB01/00319

- 8 -

In further embodiments, any of these outwardly curving upper portions may extend to form a tip (13), as shown in Figure 7.

The tray (19), or any similar embodiments may, of course, be supported upon a number of spaced apart feet, or a central pedestal in any known manner.

Figure 8 shows a further embodiment of a barrier (20) which has a series of side by side convex contours (22) along its upper margin. Additionally it is provided with a ledge (24) having a downwardly directed lip (26) along its free edge. The ledge (24) is ideally a minimum of 6cm wide. The lip (26) is preferably at least 4cm deep. An additional downwardly projecting flange (28) is provided between the lip (26) and the main barrier wall (20). Thus two downwardly open channels (27, 29) are defined. The channel (27) between the lip (26) and the flange (28) is preferably at least 4cm wide, while that (29) between the flange (28) and the wall (20) will be at least 2cm wide.

In other embodiments more than one downwardly projecting flange may be provided between the lip (26) and the main barrier wall so that more than two downwardly open channels are defined.

In use, the ledge (24) and the channels (27, 29) therebelow should be on the side of the barrier (20) facing away from the plant enclosure which the barrier is forming. The channels (27,

WO 01/54485

PCT/GB01/00319

- 9 -

29) and convex contours (22) then have a significant deterrent effect on slugs or snails approaching the barrier (20) from outside the enclosure.

Figure 9 shows a design variant in which the convex contours (22) are arranged/formed along the outside of the ledge (24) immediately above the lip (26), and thus offset from the wall (20).

Instead of a substantially horizontal ledge (24) and substantially vertical lip (26), a lip (12) of curving cross section may be preferred. This is equally effective, and four variants are shown in Figures 10 to 13. The upstanding undulations (22) are provided, respectively, along the top of the curving lip (12), along the inside thereof (in line with the barrier (20)) and along the outer edge thereof in Figs. 10 to 12. In Figure 13 the lip (26) and the additional flange (28) are both provided with terminal transverse ledges (31) which may have some additional deterrent effect on the slugs or snails.

The principles illustrated in Figures 8 to 13, namely use of upwardly directed undulations, as convex contours (22), in addition to a downwardly directed lip (26) and resultant channel or channels (27, 29) can equally well be applied to the upper edge of a plant pot or other plant container wall. Furthermore in all cases (i.e. of a barrier or of a plant container) the

WO 01/54485

PCT/GB01/00319

- 10 -

downwardly directed lip, flange and channels can be employed without the upwardly directed undulating edge. Where an upwardly directed undulating edge is provided, an additional set of encircling undulating formations may be provided at a small spacing inwardly or outwardly thereof.

Figure 14 shows a further embodiment of a tray (30) for a plant pot, in combination with a pedestal mount (32), which may be integrally formed on the bottom of the tray (30), or may be separate, the tray (30) being attached thereto e.g. by interlocking projections and cavities. The tray (30) comprises a flat base (34) having an upstanding peripheral rim formed by an array of side by side convex contours or petals (36) with intervening notches (35).

Also around the periphery of the base (34) there is a downwardly directed lip (40) of at least 4cm. Spaced inwardly of the lip (40) by at least 4cm there is a further downwardly directed annular flange, the position of which is indicated by a broken line (42). This flange (42) is formed on the underside of the tray base (34). The distance between the flange (42) and the pedestal (32) is preferably at least 1.5cm, so that two downwardly open circular channels are formed, which serve to deter slugs or snails which travel up the pedestal (32) from reaching the interior of the tray and any plant container(s) positioned therein.

WO 01/54485

PCT/GB01/00319

- 11 -

Again, in variants of this embodiment more than one additional downwardly directed flange, similar to flange (42), may be provided on the base (34) of the tray.

In other variants of this device (not illustrated) a horizontal annular ledge may be provided at the outside, encircling the rim, at the level of the base of the petals (26) for additional deterrent effect.

Figs. 15 and 16 show two ways in which the notches defined between undulations or convex contours can be extended to further deter slugs and snails from entering at the notches while still allowing drainage from enclosed beds or containers or trays or the like. Thus, Figure 15 shows a spout formation (41), which is V shaped and either horizontal or inclining downwards to its free end, and Figure 16 shows spaced convex contours (44), each formed at a facing edge with an angled baffle (45), whereby a channel is defined therebetween.

On the upper surface of the base (34), between the central area where a plant pot is to be positioned and the periphery (or the rim (36) in the case of Figure 14) an embossed annular pattern (not shown) may be provided for decoration. Concentric marks and numerals, which may also be embossed thereon, may also be provided to facilitate the central positioning of a plant container. Also upward protrusions may be provided to support

WO 01/54485

PCT/GB01/00319

- 12 -

the plant container and allow for drainage with corresponding cavities formed in their underside to receive projections from the pedestal.

It will be appreciated that other embodiments of such devices need not be circular and could be rectangular or any other shape. It will also be appreciated that the foregoing is only exemplary. The features described therein may be used in any combination and may be varied in design within the scope of the appended claims. In particular it should be mentioned that barrier forms of the device need not be continuous and could be formed by short sections placed in adjacent or overlapping arrangements, each having at least one top edge undulation in combination with a lip or with a second generally parallel undulation.

WO 01/54485

PCT/GB01/00319

- 13 -

CLAIMS

1. A barrier for providing at least part of an enclosure for plants comprising an upstanding wall having a first series of consecutive undulations provided along its top edge and means providing a second series of top edge undulations disposed at a narrow spacing from the first series.
2. A plant container comprising an upstanding wall or rim having a first series of consecutive undulations provided along or providing its top edge and means providing a second series of top edge undulations disposed at a narrow spacing from the first series.
3. A tray or the like for holding at least one plant container and comprising an upstanding rim having a first series of consecutive undulations provided along or providing its top edge and means providing a second series of top edge undulations disposed at a narrow spacing from the first series.
4. A slug and snail deterrent device as claimed in any of claims 1, 2 or 3 wherein the first series of undulations comprise a plurality of convex contours.

WO 01/54485

PCT/GB01/00319

- 14 -

5. A device as claimed in claim 4 wherein an upper portion of each convex contour curves outwardly relative to the plant container or plant enclosure.
6. A device as claimed in claim 5 wherein the outwardly curving portion extends to form a downwardly directed tip.
7. A device as claimed in any preceding claim wherein means providing the first series of undulations and/or the means providing the second series of undulations are separable from the wall or rim.
8. A device as claimed in claim 7 wherein the separable undulations comprise individual pairs of formations which are capable of attachment to the top edge of the wall or rim.
9. A device as claimed in any preceding claim wherein means facilitating drainage of water is provided between adjacent undulations of the first series thereof.
10. A device as claimed in any preceding claim further comprising a lip extending downwards for a distance of at least 4cm.

WO 01/54485

PCT/GB01/00319

- 15 -

11. A device as claimed in claim 10 wherein at least one additional downwardly directed flange is provided at a spacing inwardly of the lip so as to define at least one downwardly open channel therebetween.
12. A device as claimed in claim 11 where the or at least one of the channels has a width of at least 4cm.
13. A barrier or plant container as claimed in claim 11 or 12 wherein a second channel defined between the inner flange and the wall has a width of at least 1.5cm.
14. A tray or the like for holding at least one plant container and having the features defined in claim 11 or 12, in combination with a pedestal mount, the distance between the inner flange and the pedestal mount being at least 1.5cm.
15. A device as claimed in any of claims 10 to 14 wherein the lip and/or the flange and/or at least one of the flanges is provided with a projecting ledge.
16. A device as claimed in claim 15 wherein the ledge or ledges is/are arranged transversely at the free end of the lip and/or any flange.

WO 01/54485

PCT/GB01/00319

- 16 -

17. A device as claimed in any of claims 10 to 16 wherein the lip curves outwardly and downwardly relative to the enclosure or container or tray.
18. A barrier for providing at least part of an enclosure for plants and consisting of or including an upstanding wall having a series of consecutive undulations provided along its top edge and also having a lip which projects outwardly and downwardly away from the enclosure.
19. A plant container comprising an upstanding wall having a series of consecutive undulations provided along its top edge and also having a lip which projects outwardly and downwardly.
20. A tray or the like for holding at least one plant container comprising an upstanding rim having a series of consecutive undulations along its top edge and a lip which projects downwardly.
21. A slug and snail deterrent device as claimed in any of claims 18 to 20 wherein the lip extends downwards for a distance of at least 4cm.

WO 01/54485

PCT/GB01/00319

- 17 -

22. A device as claimed in any of claims 18 to 21 wherein at least one additional downwardly directed flange is provided at a spacing inwardly of the lip so as to define at least one downwardly open channel therebetween.
23. A device as claimed in claim 22 wherein the or at least one of the channels has a width of at least 4cm.
24. A barrier or plant container as claimed in claim 22 or 23 wherein a second channel defined between the inner flange and the wall has a width of at least 1.5cm.
25. A tray or the like for holding at least one plant container and having the features defined in claim 22 or 23, in combination with a pedestal mount, the distance between the inner flange and the pedestal mount being at least 1.5cm.
26. A device as claimed in any of claims 18 to 25 wherein the lip and/or the flange and/or at least one of the flanges is provided with a projecting ledge.
27. A device as claimed in claim 26 wherein the ledge or ledges is/are arranged transversely at the free end of the lip and/or flange.

WO 01/54485

PCT/GB01/00319

- 18 -

28. A device as claimed in any of claims 18 to 27 wherein the lip curves outwardly and downwardly relative to the enclosure or container or tray.
29. A device as claimed in any of claims 18 to 28 wherein the top edge means comprises a plurality of convex contours.
30. A device as claimed in any of claims 18 to 29 wherein an upper portion of each convex contour curves outwardly relative to the plant container or enclosure.
31. A device as claimed in any of claims 18 to 30 wherein the outwardly curving portion extends to form a downwardly directed tip.
32. A device as claimed in any of claims 18 to 31 wherein means providing the series of top edge undulations is separable from the wall or rim.
33. A device as claimed in claim 32 wherein the separable means comprises individual formations adapted for attachment to the top edge of the wall or rim.
34. A device as claimed in any of claims 18 to 33 wherein means facilitating drainage of water is provided between adjacent undulations or convex contours of the top edge means.

WO 01/54485

PCT/GB01/00319

- 19 -

AMENDED CLAIMS

[received by the International Bureau on 15 May 2001 (15.05.01);
original claims 1-34 replaced by new claims 1-16 (3 pages)]

1. A barrier for providing at least part of an enclosure for plants comprising an upstanding wall having a first series of consecutive undulations in the form of a plurality of convex contours provided along its top edge and means providing a second series of top edge undulations disposed at a narrow spacing from the first series.
2. A plant container comprising an upstanding wall or rim having a first series of consecutive undulations in the form of a plurality of convex contours provided along or providing its top edge and means providing a second series of top edge undulations disposed at a narrow spacing from the first series.
3. A tray or the like for holding at least one plant container and comprising an upstanding rim having a first series of consecutive undulations in the form of a plurality of convex contours provided along or providing its top edge and means providing a second series of top edge undulations disposed at a narrow spacing from the first series.
4. A device as claimed in any of claims 1, 2 or 3 wherein an upper portion of each convex contour curves outwardly relative to the plant container or plant enclosure.

WO 01/54485

PCT/GB01/00319

- 20 -

5. A device as claimed in claim 4 wherein the outwardly curving portion extends to form a downwardly directed tip.
6. A device as claimed in any preceding claim wherein means providing the first series of undulations and/or the means providing the second series of undulations are separable from the wall or rim.
7. A device as claimed in claim 6 wherein the separable undulations comprise individual pairs of formations which are capable of attachment to the top edge of the wall or rim.
8. A device as claimed in any preceding claim wherein means facilitating drainage of water is provided between adjacent undulations of the first series thereof.
9. A device as claimed in any preceding claim further comprising a lip extending downwards for a distance of at least 4cm.
10. A device as claimed in claim 9 wherein at least one additional downwardly directed flange is provided at a spacing inwardly of the lip so as to define at least one downwardly open channel therebetween.

WO 01/54485

PCT/GB01/00319

- 21 -

11. A device as claimed in claim 10 where the or at least one of the channels has a width of at least 4cm.
12. A barrier or plant container as claimed in claim 10 or 11 wherein a second channel defined between the inner flange and the wall has a width of at least 1.5cm.
13. A tray or the like for holding at least one plant container and having the features defined in claim 10 or 11, in combination with a pedestal mount, the distance between the inner flange and the pedestal mount being at least 1.5cm.
14. A device as claimed in any of claims 9 to 13 wherein the lip and/or the flange and/or at least one of the flanges is provided with a projecting ledge.
15. A device as claimed in claim 14 wherein the ledge or ledges is/are arranged transversely at the free end of the lip and/or any flange.
16. A device as claimed in any of claims 9 to 15 wherein the lip curves outwardly and downwardly relative to the enclosure or container or tray.

WO 01/54485

PCT/GB01/00319

1/4

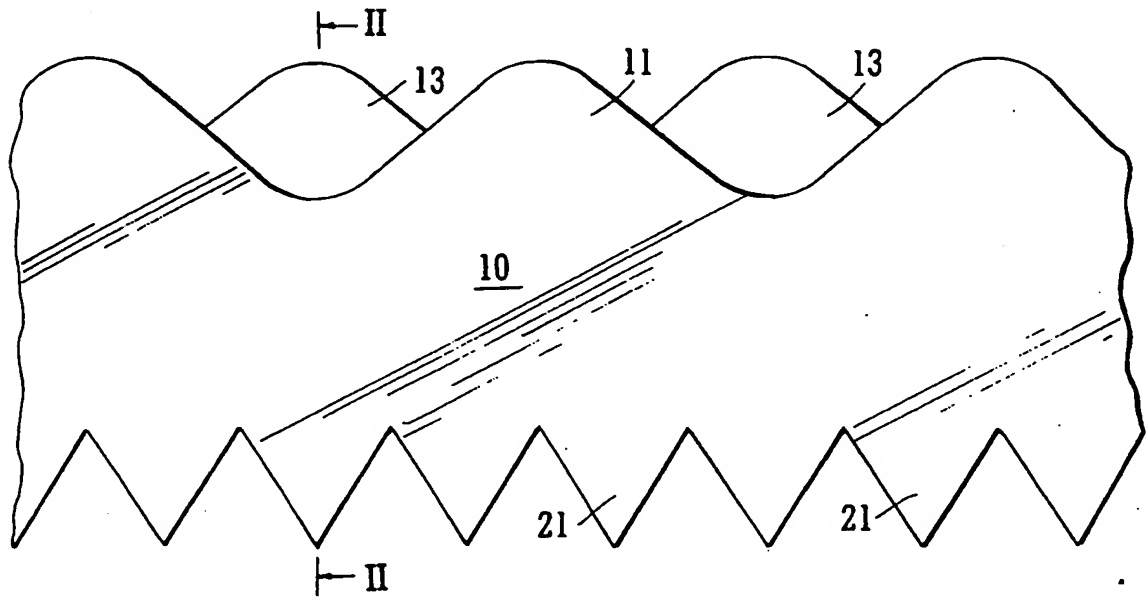


FIG. 1

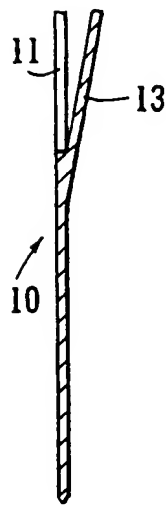


FIG. 2

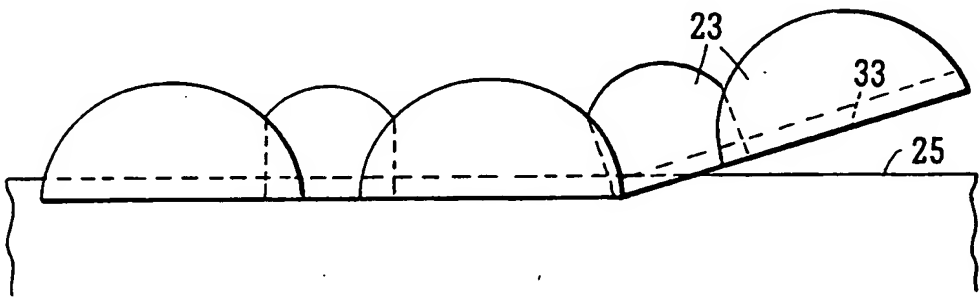


FIG. 4

WO 01/54485

PCT/GB01/00319

2/4

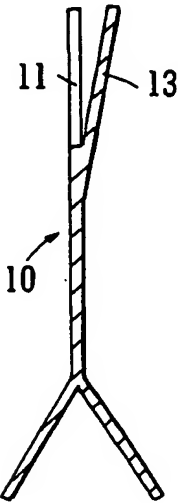


FIG. 3

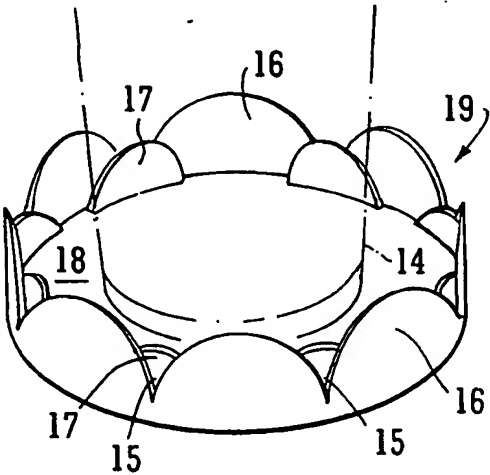


FIG. 5

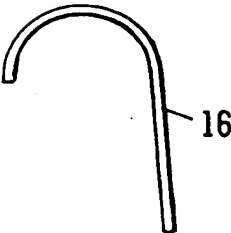


FIG. 6

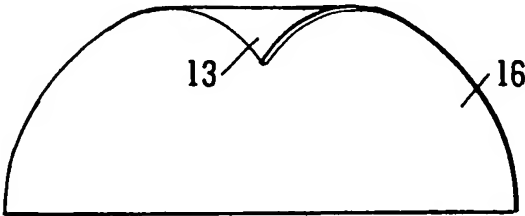


FIG. 7

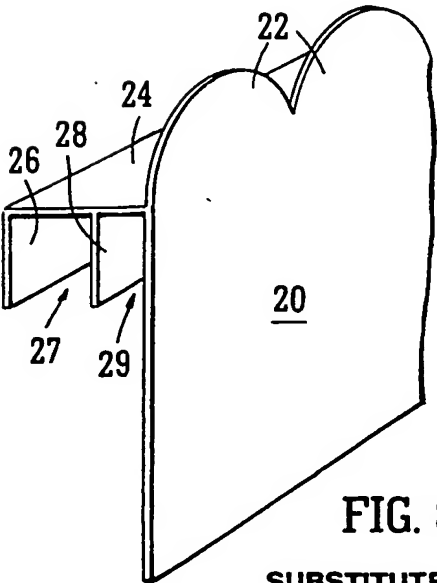


FIG. 8

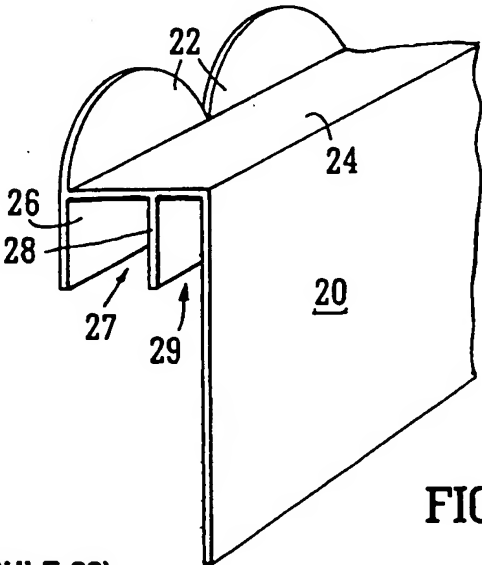


FIG. 9

WO 01/54485

PCT/GB01/00319

3/4

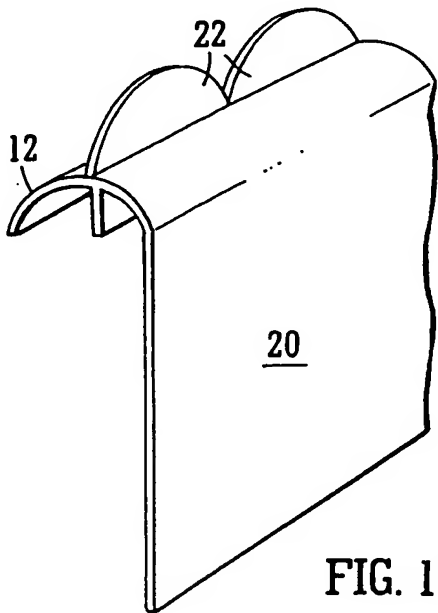


FIG. 10

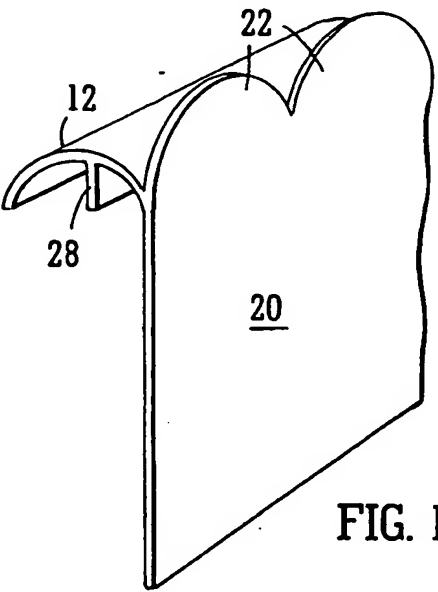


FIG. 11

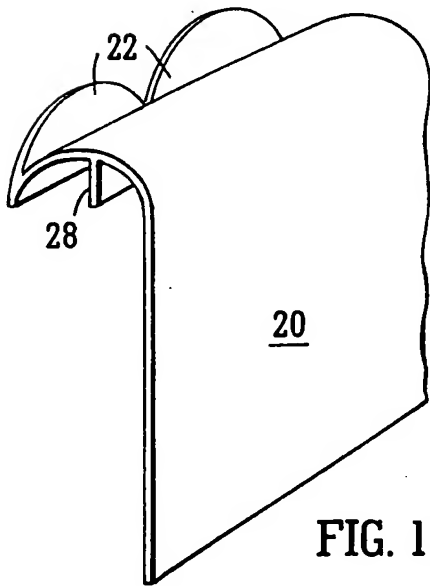


FIG. 12

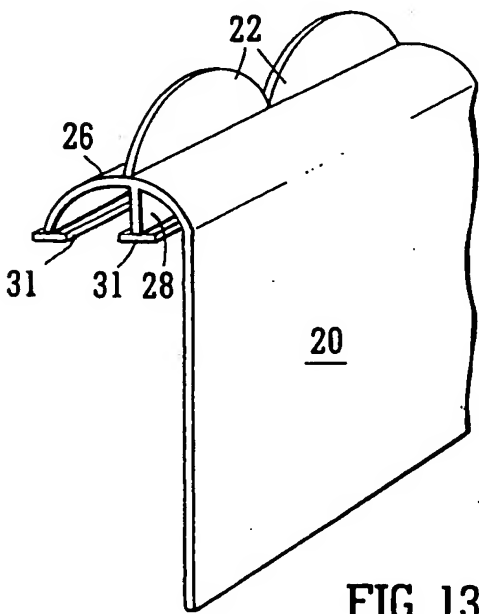


FIG. 13

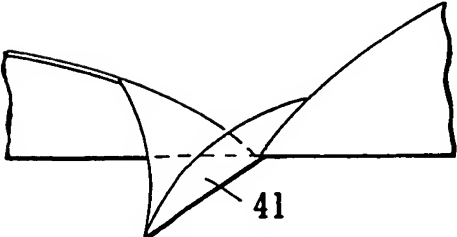


FIG. 15

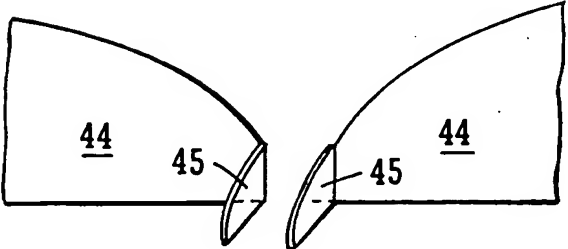


FIG. 16

WO 01/54485

PCT/GB01/00319

4/4

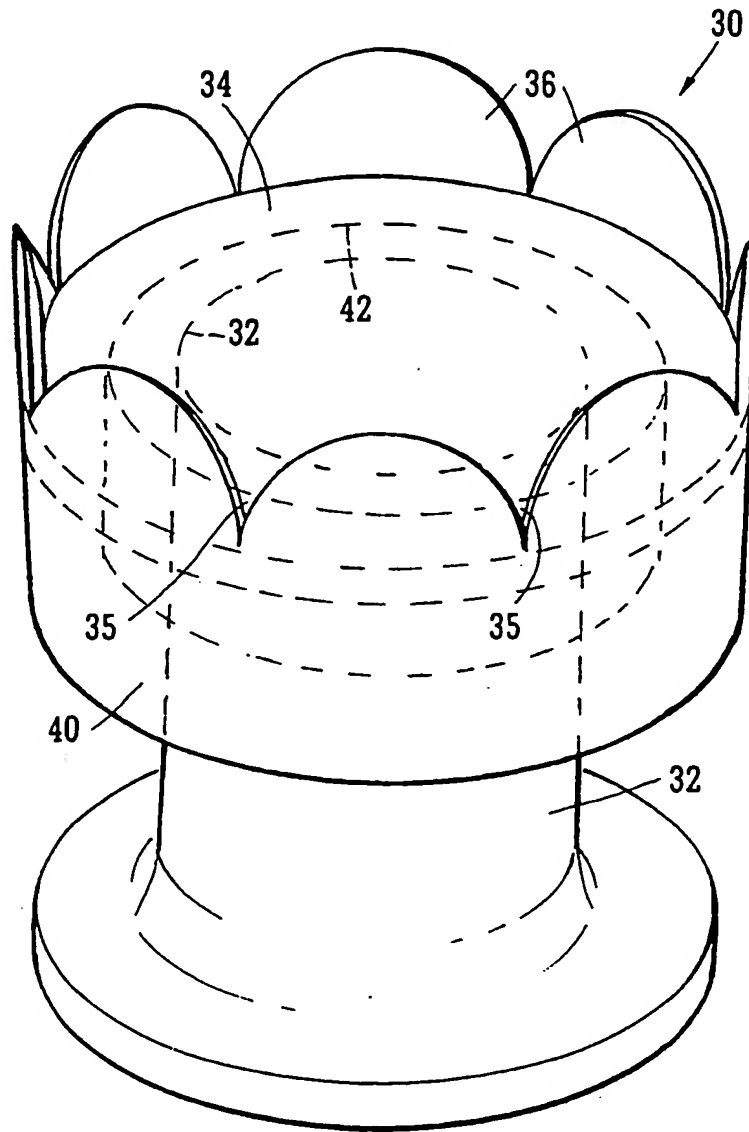


FIG. 14

INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 01/00319

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A01G13/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A01G A01M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 2 299 925 A (POWELL JOAN ELSIE) 23 October 1996 (1996-10-23)	1, 4
Y	the whole document	2, 3, 5, 6, 10-13, 16, 17
A		7, 8, 32, 33
Y	CH 673 929 A (MEINRAD ODERMATT) 30 April 1990 (1990-04-30)	2, 5, 6, 19
A	abstract; figures	14, 25, 30, 31
Y	GB 2 334 420 A (WANG HUI JI) 25 August 1999 (1999-08-25)	3, 20
A	abstract; figure 2	9, 34
	--- -/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

9 April 2001

Date of mailing of the international search report

19/04/2001

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INTERNATIONAL SEARCH REPORT

International Application No
PC1/GB 01/00319

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	DE 38 04 119 A (SCHOECK GEB SCHUSTER ;SCHOECK EBERHARD (DE)) 24 August 1989 (1989-08-24) abstract; figures ---	10-13, 16-24, 26-29
Y	FR 2 508 510 A (DEBIESSE TIXIER ROBERT) 31 December 1982 (1982-12-31) page 2, line 30 -page 4, line 3; figures 1,6,8,11,13 -----	18-24, 26-29 1-9
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 01/00319

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
GB 2299925	A	23-10-1996	NONE	
CH 673929	A	30-04-1990	NONE	
GB 2334420	A	25-08-1999	KR 245336 B	15-02-2000
DE 3804119	A	24-08-1989	NONE	
FR 2508510	A	31-12-1982	NONE	